Synthesis

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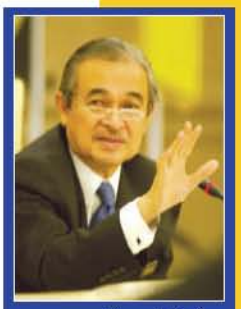
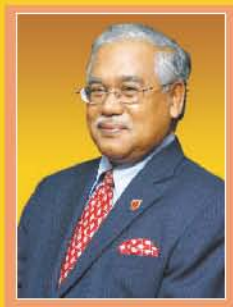


.... announced to revitalize the Agriculture sector ....
— Datuk Seri Abdullah Ahmad Badawi, Prime Minister, Malaysia



"....Complacency is dangerous and we have to realize our vision in order to be globally competitive"
— Tan Sri Dato' Seri Dr. Zainul Ariff Hj. Hussain

Contents

What's Next

Highlights from the next issue –

- *Biotechnology for Cost-efficient production of the Shitake Mushroom*
- *Sludge Bioconversion*
- *Interlocking Load-bearing Hollow Block*

In the Making –

UPM showcases its vision of success

"....Over the long term, we hope to use our financial resources to hire internationally prominent professors",— Muhamad Zobadie Bardale, Vice-Chancellor, UPM.

"....the bulk of our research and academic syllabus remains focused on agricultural and science-based issues", — Mahamad Awang, Deputy Vice-Chancellor (Academic).

"....the University with a more creative and productive environment to pursue research, teaching and professional services"— Mohd. Shahwahid Othman, Director, (RMC).

UPM then known as Universiti Pertanian Malaysia started as a School of Agriculture in 1939. From a traditional university focusing on undergraduate studies in agriculture and related fields, UPM has from the early 1980s expanded to include science and technology.

It was in 1994 that UPM formulated a plan to become the 'university of the next millennium', providing an up-to-date educational system with state-of-the-art facilities for the science and technology fields, while emphasising the need to include information technology in its day-to-day applications. Since then, UPM has rapidly transformed to a borderless campus extending beyond the national boundaries. This dream became a reality in 1997 when the then Prime Minister of Malaysia, Tun Dr. Mahathir Mohamad officially declared the change of name from "Universiti Pertanian Malaysia" to "Universiti Putra Malaysia".

Universiti Putra Malaysia (UPM) now treats research as an investment to innovation. In this light, it places a high emphasis on commercialisation of research including patenting, and development. Its multi-faceted research is a showcase of diversity and cross-disciplinary work, recognising the importance of cutting-edge relevance, with potential for economic spin-offs.

■ Turn to Page Three

Development of Innovative Functional Foods and Nutraceuticals

Suhaimi Napis and Suhaila Mohamed

Good nutrition influences health and well being and may play a preventative role against many diseases. It is well-known that soya products such as soya milk drink, *tempeh* and *tofu*, carotene in oil palm, as well as lycopene in tomatoes may reduce the risk of cancer; probiotics and prebiotics create a healthy gut microflora; and unsaturated fatty acids and plant phytosterols are useful for cholesterol reduction. The health related aspects of food accelerate innovations in the food industry and have a high market potential.

■ Turn to Page Nine

Editorial

UPM's academic reputation....

In the corridors of any ivory tower, there is a quality that reverberates over the years or even centuries. The academic reputation of an institution is this sacred quality.

As a result of our common aspirations, distinctive talents, and continuous quest for excellence, the year saw yet another increase in the number of staff promotions who benefited at large.

The table below highlights a list of newly promoted academic staff at UPM.

To Full Professorship *(1/3/04 - 1/9/04)*

1.	Abdul Razak b Alimon	*Agriculture*
2.	Zulkifli b Idrus	*Agriculture/ RMC*
3.	Mohd. Arif b Syed	*Biotech*
4.	Mohamad Ali b Abdul Hamid	*Economics and Management*
5.	Mohd. Shahwahid b Hj. Othman	*Economics and Management/ RMC*
6.	Russly b Abdul Rahman	*Food Science & Technology*
7.	Md. Salleh b Hj. Hassan	*Modern Languages & Communication*
8.	Karen Ann Crouse @ Karen Badri	*Science*

1 2 3 4 5 6 7 8

To Associate Professorship *(1/4/04 - 1/5/04)*

1.	Jothi Malar Ponandam	*Agriculture*
2.	Radziah bt Othman	*Agriculture*
3.	Wong Shaw Voon	*Engineering*

1 2 3

Heartiest congratulations go to one and all the above faculty members who were promoted from 1 September 2004!

Executive Editors
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Spotlight

Innovate or be left behind—
Global aspirations and pursuits

Research is an important component at public institutes of higher education with billions poured in by the Government to improve research and development infrastructure.

While some of the older universities have established themselves as research institutions, the younger ones, including university colleges, are taking steps, which will lead them to become centres of excellence in research and development.

Researchers must place emphasis on protecting intellectual property as any delay in registering for a patent could cause research findings to be commercialised by irresponsible quarters. In the era of globalisation, it cannot be denied that the economic growth of a country depends on its ability to create new innovations and come up with fresh findings. A university, which fails to do this, will be left behind. Researchers should collaborate with the private sector to conduct research and development as is practised elsewhere in many developed nations.

Universiti Putra Malaysia (UPM) can trace its origins to the School of Agriculture, which was officially instituted in 1931. The school that was located on a 22-acre spread in Serdang was declared the Agricultural College of Malaya in 1942, and was upgraded to a university status in 1962. In October 1971, the College of Agriculture and the University of Malaya's Faculty of Agriculture merged to form the Universiti Pertanian Malaysia (UPM). The University started its academic programme with 1,559 students in July 1973 with three main faculties - Faculty of Agriculture, Faculty of Forestry and Faculty of Veterinary Medicine. Besides the three faculties, there was also a Basic Sciences Department. On 3rd April 1997, Universiti Pertanian Malaysia was renamed to form Universiti Putra Malaysia.

UPM is now an established University that is committed to excellence in research and, to developing and maintaining a culture of research offering comprehensive courses in all major disciplines, ranging from agriculture, medicine, engineering, information communication and technology, and the sciences to social sciences and business with agro-bio as its niche.

Research at UPM is a catalyst for the University's educational and entrepreneurial thrusts. It turns learning into discovery and translates knowledge into innovations. UPM treats research as an investment to innovation. In this light, it places a high emphasis on commercialisation of research and development.

I would like to end by saying, as the potential synergies among our strengths are unleashed, UPM will advance towards global excellence in education, research and service. In short, it is each individual's personal quest for excellence in distinctive areas of strength that will build UPM into a global university. Working together, the strengths and achievements of the community will multiply and transform our university to thrive amidst relentless global competition. These achievements are testament to the strength of the University, which should be built upon in the coming years.

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Chitosan base post harvest treatments for extending storage life of Papaya and cut Chrysanthemum

Asgar Ali, Mahmud.T.M.M,Kamaruzaman.S,Mohd. Zaki Ab. Rahman and Eddy Azian

Award Winner

Chitosan is a deacelated form of chitin, which can be extracted from the cell walls of fungi and some algae as well as the exoskeleton of arthropods and even shells of mollusks. Chemically chitin is a polysaccharide, after deacetylation, chitin becomes chitosan.

Fungicides can control post harvest decay of fruits, however, fungicides also leave residues and therefore number of fungicides tolerant post harvest pathogens are growing. Thus this study explores ways to replace fungicides by natural products or to intensify the natural defences of tissue to control decay and prolong storage life.

Chitosan is an ideal preservative for fruits and flowers. It can be considered as a safe material that is indicated by toxicological studies. It has been shown to inhibit the growth of several fungi. Due to its ability to form a semi permeable film, a chitosan coating is expected to modify the internal atmosphere of fruits to decrease transpiration losses, therefore a delay in ripening is occurred. Chitosan also reduces the microbial population in vase solution. Recent studies conducted at UPM indicated that a chitosan coating could be beneficial for papaya in enhancing its shelf-life and increasing vase life of cut Chrysanthemum. It is shown to reduce microbial growths in Papaya and in vase solution of cut Chrysanthemums thus; chitosan can be a potential alternative biocide for Papaya fruits and cut Chrysanthemum.

Uncoated fruits after 3 weeks at 10° C

1.5% chitosan coated fruits after 3 weeks at 10° C

Cut chrysanthemums in different concentrations of chitosan being displayed in the Postharvest Lab.

SILVER – *UPM Invention & Research Exhibition 2002 (PRP 2002).*

Reader Enquiry

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....UPM showcases its vision of success....

■ *From Page One*

"We aim to increase our research activities further at the postgraduate level", says vice-chancellor Professor Dato' Dr. Ir. Mohd Zohadie Bardaie. Our goal is to transform UPM into a renowned research university by instituting special programmes to achieve a Nobel prize. Over the long term, we hope to use our financial resources to hire internationally prominent professors. We are opening up the university to foreign students. The purpose of this is not for the immediate financing of the university's operations but to attract the best brains in the world to Malaysia says the vice-chancellor. By completing their postgraduate studies here, foreign students will contribute to UPM's research and development (R&D) that enables the university to operate with some financial independence. "The benefit is, we get our research done", says Mohd. Zohadie.

Speaking of its research and academic strength, the vice-chancellor says UPM is the top PhD employer among public universities, based on a survey by Universiti Sains Malaysia conducted in the past.

While UPM's new focus has been in tele-medicine, medical consultancy and health services, agriculture is still a hot topic at UPM with the bulk of its research and academic syllabus remains focused on agricultural and science-based issues. On a cluster-research and teaching basis, other disciplines in engineering, economics and management address problems relating to Malaysia's food production, horticulture and animal husbandry. More than 70% of UPM's budget is used in agriculture-related programmes, and in terms of emphasis, 75% of our R&D programmes are in agriculture or agriculture-related or bio-based research-activities, said Ecophysiologist Professor Dr. Muhamad Awang, deputy vice-chancellor for academic affairs.

The UPM campus has been transformed into an educational and an Agricultural Technology Park to reinforce the relevance of agricultural educational learning acknowledges the vice-chancellor.

A glance at creating new frontiers of innovative research at UPM, and research snapshots showed research ranging from the structural biology of the reproductive organs of some tropical fruits to the design and fabrication of a bulletproof vest using a hybrid composite material system.

Research at UPM is not necessarily in traditional agriculture, but in high technology agriculture, affirms Resource & Environmental economist Professor Dr. Mohd Shahwahid Othman, director of the university's Research Management Centre. Advances in internationally competitive infrastructure, research funding, major research collaborations and quality research training have enhanced our research profile tremendously, he added. UPM is a place with a more creative and productive environment to pursue research, teaching and professional services.

Turning Biological Diversity into Invaluable Economic Resource

Award Winner

Nordin Hj. Lajis and Khozirah Shaari

The diversity and abundance of Malaysian biological resources offer a vast opportunity for their utilization to benefit the country. These resources are mostly unexplored for their potential as the sources of new and highly valuable chemicals. The rich cultural heritage of the communities in this country, with respect to the traditional medicine and health keeping is an additional asset to guide the prioritization of these resources. In order to realize these potentials, a proper research plan is designed and strategized to maximize the findings and benefits.

A number of screening programs directed toward the discovery of new drugs for several important diseases such as cancer, inflammation-related disorders and general health have been established in our laboratory at UPM. These programs are used as the basis for evaluation and selection of plants, microorganisms or animals to be further investigated. Isolation and identification of the active molecules are based on the bioactivity-guided approach utilizing various separation techniques and spectroscopy. Integration of ideas between experts in various fields including isolation and characterization of chemicals, pharmacology, genetic engineering, taxonomy and other related areas are utilized in this research program.

Fresh fruits of G. atroviridis contain antimicrobial garcinia acid lactone

Fruits of Alpinia rafflesiana

Several bioactive compounds have been isolated from selected Malaysian plants. Some of these compounds have not been reported in the literature and thus represent new compounds from nature. The compounds isolated from *Morinda elliptica*, damnacanthal and nor-damnacanthal are further investigated to determine the true potential as anticancer agents. Several derivatives of these compounds are being synthesized to establish the structure-actvity relationship and pursue their alternative sources. Another potential anticancer agent, deoxypodophyllotoxin, was also isolated from *Juniperus chinensis*. It is also discovered that a high quantity of arbutin, a known antioxidant used in cosmetics and preservation can be isolated from a type of weed, *H. herbacea*.

Study on *Garcinia atroviridis* resulted in the isolation and identification of the dibutyl methyl ester of α-hydroxycitric acid and the respective β-lactone, which act selectively and strongly against *Cladosporium herbarum*, a common agricultural fungus. We have also isolated several new compounds including a prenylated benzoquinones and depsidones as well as a number of biflavonoids compounds.

New information on the anti-oxidative property occurring in most of the zingiberaceous species is now available in our country. This information provides support for the claims on their medicinal use in most of the traditional remedies and potential use as health supplements. The results also indicated that there might be some relationship between anti-oxidative with anticancer promoting activity. We have also discovered that certain curcuminoids and flavokawin-B has strong cytotoxic property specifically against MCF 7 - breast cancer cell line. Further work on the potential of developing these compounds as anti-cancer agent is continued.

Further screening of our biological resources for selected pharmacological activities is still to be one of our continuing activities. It is hoped that effectiveness of this effort will be more enhanced by combining the different approaches including the taxonomic, ethno-medical as well as based on the available literature data. The arrival of new instruments such as high field NMR, liquid chromatography coupled mass spectrometer and gas chromatography coupled mass spectrometer will be our valuable asset for fast de-replication of results and decision making. These facilities will also allow us to develop standardization procedures of herbal medicines. The bioassay facilities in our laboratory complex will also be further improved to allow a wider range of pharmacological tests to be conducted and to allow participation of the public and private parties.

GOLD – *UPM Invention & Research Exhibition 2002 (PRP2002).*

Reader Enquiry

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Xenoassay-metal™, a heavy metal bioassay system

Mohd Yunus Abd. Shukor, Azlan Baharom, Shahizal Raslan, Mohd. Arif Syed, Nor Aripin Shamaan, Mohd. Puad Abdulah, Muhajir Hamid

Award Winner

Rapid and sensitive measurements of heavy metals are required in various fields such as environment, food industry and medicine. Classical methods such as atomic absorption spectroscopy, inductively coupled plasma optical emission spectrometry, inductively coupled plasma mass spectrometry and their combination with chromatographic techniques need sophisticated instrumentation, skilled personnel, complicated sample pre-treatment and sometimes a long measuring period thus simple and fast procedures used as screening tests for industrial process water or foodstuffs to indicate the presence of toxic heavy metals are especially important (Han *et* al., 2001). There is also a need for an inexpensive, simple and rapid enzymatic assay for heavy metals. We have therefore explored the potential of papain, a protease, as a sensitive assay for heavy metals.

Xenoassay Kit

An enzymatic bioassay of heavy metals has been designed at UPM based on the inhibitive properties of protease by heavy metals and the sensitive assay of this inhibition by the casein-Coomassie Blue proteolytic assay. Among the various proteases tested, bromelain and papain offers the best system in terms of sensitivity, accuracy and precision as well as it is simple, rapid and economical. The calculated bromelain IC_{50} for mercury, and copper is 0.20 and 0.12 For the purpose of quantification, the limits of

Field trial

quantitation (LOQ) of the heavy metals, which is sometimes assigned as ten times the baseline signal, the LOQ for mercury and copper are 0.1 mg/l and 0.1 mg/l for bromelain. The LOQ values for mercury are twice the maximum permissible limit allowed in industrial effluent in Malaysia whilst the LOQ and IC_{50} values for copper is below the maximum permissible limit (Malaysian Environmental Quality Act 1974). Thus the assay system could detect levels of toxic heavy metals at the level of the maximum permissible level of toxic metals in Environmental quality act 1974 (environmental quality (sewage and industrial effluents) regulations 1978). This suggest that the papain inhibitive assay is best suited to monitor at the large-scale level; industrial effluents, sewage outlets and rivers in Malaysia specifically and globally in general for toxic level of mercury and copper.

Field trials conducted at UPM with water samples collected from several rivers and drains in Penang especially in the Juru area revealed that the Juru Derhaka River contains heavy metals.

Interference tests were also conducted. We added pesticides (Carbofuran, imidaclopri,

Interference tests conducted at toxic site

diazinon, metalochlor, flucythrinate, coumaphos, carbaryl, atrazine simazine, paraquat, diuron, endosulfan) 1 mg/L final) detergents (SDS and Dettol at 1% final), hydrocarbons (diesel at 1%). These xenobiotics, at the tested levels are commonly present in polluted water. We found that the Xenoassay kit is not interfered by the presence of these metals.

From the studies conducted, it can be concluded that the Xenoassay™ is suitable for monitoring industrial effluents, sewage outlets and rivers in Malaysia at large-scale levels. Thus, this system has a tremendous commercial potential.

The kit has won several medals and is patent-pending under Malaysian Patent registration number: **PI 20033505.**

SILVER – *International Exhibition for Inventions, Innovations, Technology & Industrial Design (ITEX 2004).*

SILVER – *Expo S&T 2004 .*

BRONZE – *UPM Invention & Research Exhibition and Awards 2003 (PRP 2003).*

Reader Enquiry

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ResearchHappenings

Vice-chancellor's Fellowship Awards for Outstanding Performance *(17 Dec. 2004)*

RECOGNITION: Assoc. Prof. Dr. Sidek honoured with the UPM's *Best Teaching Award 2004*

KEEN INTEREST! Assoc. Prof. Dr. Arfah Salleh receiving UPM's *Best Teaching Award 2004 from the Vice-Chancellor*

SPIRIT OF FULFILMENT! Dato' Zohadie congratulating Dr. Jaleluddin Harun while giving him UPM's *Professional Services Award 2004* as Tuan Haji Kamalul Aripin Musa looks on

SPIRIT OF FULFILMENT: From left—Prof.Yaakob Che Man, Dr. Jaleluddin Harun, A.P. Dr. Sidek and A.P. Dr. Azmi Yahya with their awards

e-SPRINT Training Course @UPM Campus Bintulu, Sarawak *(29-30 Nov. 2004)*

TOWARDS EXCELLENCE: e-SPRINT Course coordinators, (from left front row), Assoc. Prof. Dr.Mohd. Kamil Yusof and Assoc. Prof. Dr.Sidek Ab. Aziz always on track to assist

EDUCATIONAL: UPM Bintulu Campus participants at the e-SPRINT Course organized by BTM, UPM and UPM Bintulu

KEEN INTEREST: Participants at the e-SPRINT Course that would help strengthen R&D at UPM

SPIRIT OF FULFILMENT: Successful participants at the end of the 2-day Course

Excellent Scientist Award *(17 Sept. 2004)*

EXCELLENT SCIENTIST AWARD 2004: Prof. Dr. Muhamad Awang (Deputy Vice Chancellor (Academic) and Prof. Dr. Mohd. Shahwahid Othman, Director, RMC (Centre) motivating the recipients at the Grand Ballroom, KL Legend Hotel, Kuala Lumpur

ALL SMILES: The Proud winners and recipients of S&T Excellent Scientist Award 2004

The British Inventions Show, U.K. & Ideas-Inventions-New Products International Exhibition, Germany *(21-31 Oct. 2004)*

TALENTED LOT: Proud winners of the international exhibition awards held at UK and Germany

MAKING AN IMPACT: Dr. Fakhrul-Razi Ahmadun recipient of a Special Silver Award at the British Inventions Show

WELL DONE: Dr. Fakhrul-Razi Ahmadun recipient of yet another Gold medal at the BIS, UK, and, 2 Silver medals and a Special Switzerland award at the IENA, Germany

MAKING WAVES: Dr. Robiah Yunus recipient of two Gold and one Silver medals at the BIS, UK and IENA, Germany

WORTH IT: Mr. Mohd. Hanif Yaacob recipient of two Gold awards at the BIS, UK & IENA, Germany

AN HONOUR: Mr. Ratnasamy Muniandy recipient of two Gold medals at the BIS, UK and IENA, Germany

INTERNATIONALLY RECOGNISED: Dr. Wong Shaw Woon recipient of one Gold and one Bronze medals at the BIS, UK and IENA, Germany

HARD WORK AND DEDICATION: Paid it all for Dr. Mohamad Razali Abd. Kadir when he received 2 Silver medals at the BIS, UK and IENA, Germany

FOCUSED: Dr. Mohamad Razali Abd. Kadir well equipped on his R&D exhibit

R&D Commercialization Luncheon *(11 Oct. 2004)*

OPENING NEW REVENUES: RMC director, Prof. Mohd Shahwahid giving a token of appreciation to Dr. Maznah Ismail, speaker at the Commercialisation Luncheon

EXPANDING RESEARCH: RMC organises Commercialisation Luncheons in its efforts to boost industry linkages

FOOD FOR THOUGHT!: RMC director, Prof. Mohd Shahwahid with invited participants at the Commercialisation Luncheon

Newsmakers—building rapport (the year in nutshell)

R&D FOCUS: Prime Minister Datuk Seri Abdullah Ahmad Badawi at the MAI-A exhibition 2004..... public universities do more than educate students, they offer world-class consultancy and research services

RECOGNITION: Prime Minister Datuk Seri Abdullah Ahmad Badawi receiving a token of appreciation from Dato' Zohadie while Tan Sri Muhyiddin Yassin looks on

A WARM WELCOME: Vice Chancellor Dato' Zohadie welcomes Malaysia's former Prime Minister Tun Dr. Mahathir Mohamad on his arrival at UPM before being awarded an Honorary Doctorate

HONOURING A TRUE STATESMAN: Tun Dr. Mahathir Mohamad (centre) after receiving an Honorary Doctorate in Science from UPM Chancellor Sultan Sharafuddin Idris Shah of Selangor at the University's 26th Convocation Ceremony on 18 September 2004

MEMORABLE EVENT: Dato' Zohadie with Tun Dr. Siti Hasmah Mohd Ali at the 2nd Malaysian Exhibition on Healthy Ageing organized by UPM and Malaysian Healthy Ageing Society on 9 April 2004 at Berjaya Times Square, Kuala Lumpur

UNIVERSITY VISIT: Prime Minister Datuk Seri Abdullah Ahmad Badawi welcoming UPM Vice Chancellor Dato' Zohadie and his delegation on their arrival at Putrajaya on 8 November 2004

ALL WORKING TOGETHER: UPM officials being welcomed by the Prime Minister at Putrajaya

COMING TOGETHER: UPM delegate at Putrajaya. From Left are Prof.Dr.Azhar Md. Zain, Prof. Dr.Nik Mustapha Raja Abdullah, Tuan Haji Kamalul Aripin Musa, Assoc.Prof.Dr.Azmi Yahya and Assoc.Prof.Dr.Azali Mohamad

EXCHANGING VIEWS: UPM Deputy Vice-Chancellor of academic affairs, Professor Dr. Muhamad Awang with Tan Sri Muhyiddin Yassin, Minister of Agriculture and Agro based Industry, Malaysia

TOWARDS PROGRESS: Tan Sri Muhyiddin Yassin receiving a token of appreciation from Dato' Zohadie during a public lecture *"Memperkasa Pertanian Negara"* on 4 April 2004 at UPM

LOOKING FORWARD: Tan Sri Dato' Seri Dr. Zainul Ariff Hj. Hussain, Chairman, UPM Board of Directors sharing his views with the Prime Minister

EXPANDING OUTREACH: After the successful accomplishment of the UPM's Sports Academy, Dato' Zohadie presents UPM flag to Prof.Dr. Shamsher Ramadili, Head of Contingent at the Malaysian Universities Staff tournament in April 2004

A STEP FORWARD: UPM organizes customer service day every 4th Saturday of the month

RECOGNITION: UPM treats research as an investment in innovation — a cheque presented by Exxon Mobil to UPM for research, in the centre is Dato' Dr. Chua Soi Lek, Minister of Health, Malaysia

NETWORKING: The signing of an MoU between UPM and a Private Higher Educational Institute (IPTS)

PROMOTING EXTERNAL TIES: Signing of an MoU between UPM and FELDA Palm Industries Sdn. Bhd. and Kyushu Institute of Technology in July 2004 for research in Biogas and Biomass

FOREIGN CONNECTIONS: UPM as a global knowledge hub, a MoU signed between UPM and Institute Pertanian Bogor (IPB), Indonesia in July 2004

BENEFICIAL: UPM focuses on establishing links with renowned educational institutions—Dr.Djoko Suprato, deputy director, SEAMEO-SEARCA in a discussion with Dato' Zohadie during his visit to UPM on 8 Nov. 2004

PM: Interest on agriculture has been climbing since the Prime Minister Datuk Seri Abdullah Ahmad Badawi announced his intention to revitalize the sector.

Tree Crop Seedling Transplanter Ver-1

Azmi Yahya and Darius El Pebrian

Award Winner

Seedling transplanter Ver-1

Transplanter trailed behind a tractor

Tree Crop Seedling Transplanter Ver-1 is the first available machine of its kind in the market. This transplanter is able to overcome the arduous work, labour, and cost in the field transplanting operation of tree crop seedling. This transplanter is trailed behind an agricultural tractor having at least 63.4 kW and 66.2 L/min@172.36 bar hydraulic auxiliary outlet. Its design configuration consists of the main chassis, seedling bin, seedling planting assembly, operator compartment, and associated hydraulic system. Two operators are required for the seedling transplanting operation with this mechanized system; a driver for the tractor and an operator to operate the hydraulic control system on the transplanter.

The transplanter is a complete integrated system capable of preparing the planting hole, placing the seedling and covering of the seedling in the prepared hole, and compacting of the soil around the planted seedling in plantation field. The fluid power from the tractor's hydraulic auxiliary is used to operate all available actuators of the functional units within the machine. With oil palm seedlings, this mechanized system gives a planting capacity of 99 seedlings/man-day or 0.62 ha/man-day as compared to 0.28 ha/man-day or 45 seedlings/man-day with the commonly manual system; an improvement of 2.2 times. The estimated planting cost is RM2.22 (USD 0.56)/seedling with this mechanized seedling as compared to RM2.26 (USD 0.59)/seedling with the commonly manual system; thereby a reduction of 6.64 percent.

Transplanting of oil palm seedlings in operation

GOLD Merit Medal – *Invention & New Product Exposition, Pittsburg (INPEX 2004).*

Award of Excellence – *Excellent Scientist Award 2004.*

GOLD – *UPM Invention & Research Exhibition and Awards 2002 (PRP 2002).*

SILVER – *International Exhibition of Inventions, New Techniques & Products, Geneva 2002.*

BRONZE – *Invention and Innovation Competition 2001 (MOSTE).*

Reader Enquiry

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A Portable Fiber Optic Based Lightening Detection System

Ishak Bin Aris and Goh Hong Keong

Award Winner

The portable fiber optic-based lightning detector system is used to provide a reliable system (affordable, accurate, emits less noise and causes less interference), which is capable of monitoring, detecting and storing automatically, the data of the lightning profile. A photo detector is applied to the front-end of the system as the sensing element for the lightning flash. The system uses fiber optic as its transmission system to transmit the data from the lightning detector to the analog receiver at the other end of the fiber optic. A Programmable Logic Controller (PLC) that is part of the system is used to collect and store the data with the time and the date of occurrences, and this data can be viewed or retrieved through the personal computer (PC).

The system can be operated in two modes namely off-line and on-line modes. In the off-line mode, the system operates independently to record the data at designated and remote site. There is no computer connected to the system during its data recording activity. The system will record the lightning activities for a predetermined period. After this period, the user can come and collect the data. The PC is then connected to the system to retrieve the data. In the on-line mode, the system is linked to the server database directly via an Internet. Many systems can be linked to the server database. The data is recorded and compiled automatically and continuously to the server database.

Lightening Detection System

The product has won several medals and is patent-pending under Malaysian Patent registration number: **PI 20020851.**

Award of Excellence – *Excellent Scientist Award 2004.*

SILVER – *International Exhibition of Inventions, New Techniques & Products, Geneva 2002.*

Special Award – *International Exhibition of Inventions, New Techniques & Products, Geneva 2002.*

BRONZE – *International Invention, Innovation, Industrial Design & Technology Exhibition (I-TEX 2002).*

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Haruan Biomedical Products for SKIN DISEASES

Abdul Manan Mat Jais Muhamad Nazrul, Son Chit and Mohd. Roslan Sulaiman

Award Winner

PATENT PENDING PI 9501562 INNOVATIVE R&D

A carnivorous and air breathing tropical freshwater fish locally known as Haruan *Channa striatus* is indigenous to Malaysia, and this is an important criterion for development of haruan based biomedical products. Although other species of the same family Channidae as haruan is also found in almost every country in the Asiatic region, but none is yet to be fully utilized for the biomedical products. The white boneless meaty tender taste makes *C. striatus* as good source of protein with a high 78.32 ± 0.23 %, a low 2.08 ± 0.08 % and 0.265 + 0.013 mg Vitamin A per total lipid, and menu fish in many countries in the region. Haruan contains almost all of the nutritional minerals, with high content of Arachidonic Acid (AA) 20:4ω6 that is related to the potential of haruan for wound healing. More interestingly, haruan also contains docosahexaenoic acid (DHA) 22: 6wω3 which is now being recognized as the compound responsible to reduce cholesterol in human, and not eicosapentaenoic acid or EPA 22:5ω3. This will be one of the main focuses of the biomedical products and on the future R&D into pharmaceutical products.

The haruan based body scrub for exfoliation dermatitis such as sclerosis, psoriasis, eczema and etc., has also won a medal. However, a conclusive clinical trial is required for pharmaceutical listing and patent.

Haruan contains all the 17 essential amino acids required for healing and the substantial amount of glycine, one of the most important components of human skin collagen, and together with other amino acids to form a polypeptide or perhaps other macromolecules that is or are associated and responsible for growth and healing. Furthermore, haruan's extract has a mild antimicrobial, antifungal, induced platelet aggregation and interestingly produces a dose-dependent antinociceptive property, which is essential in healing processes. All these biochemical, physiological and pharmacological properties of *C. striatus* have beyond doubt contribution towards, tissue repair, growth and healing.

Haruan Channa striatus

Samples of haruan tablet and capsules

Haruan fillet

Biomedical Products for Skin Diseases: body scrub, cream, lotion and antiseptic powder. The products are based on the formula that won awards, and are purely for treatment of skin diseases namely sclerosis, eczema, psoriasis, pimples, insect bites, rushes and allergy.

Haruan Byproducts: personal care - cosmetic and health food products. Haruan extracts and herbal portion will be blend and formulated together as byproducts namely personal care products, health food and supplementary. Other products in this category would be shower gel or bath lotion, beauty soap, body lotion, cream and loose powder Haruan lotion and cream; haruan fillet, tablets and capsules.

Paper Commendation Award – *Annual Scientific Meeting (Singapore 1997).*

BRONZE – *MINDEX/INNOTEX 1996.*

Reader Enquiry

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....Innovative Functional Foods and Nutraceuticals

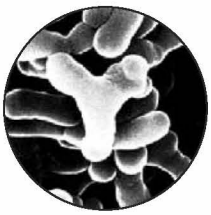
From Page One

Development of functional food requires an understanding of the complexities of nutrition. Proteome, metabolome and nutrigenome research all allow for the first time a unique correlation between nutrition and its subsequent physiological effects in an organism. These results are gaining more acceptances in the medical sciences and by regulatory and legislative organisations. The use of biotechnological methods enables the identification of many more nutritional targets and demands as well as the development of innovative foodstuffs, for example through:

Tempeh

- Clarification and identification of novel ingredients and their mode of action;
- Development of biomarkers to aid the recording of health and well-being;
- Investigation of a diet-gene interaction and subsequent changes in gene expression and metabolic profiles.

Modern biotechnological methods can also be used to demonstrate the effects of functional food. For probiotics clinical methods have shown a positive effect in humans. Experimental studies using animal and *in vitro* models based on intestinal microflora and mucosa as well as immunity is used to support this global health effect. Reduced infection with Rotavirus that causes diarrhoea has also been shown due to interactions between probiotics and gut cells. The marketing and distribution of functional food is complicated by what are the health claims that can be communicated. To quote Prof. Dr. Andrea Pfeifer, former Director of Nestlé Research Centre 'It is not the physician that must be informed but the consumer, who should understand the exact advantages of modern nutrition and foodstuff innovations'. The results of thorough clinical studies for validated products as well as the all-important regulatory aspects ensure that there is a relevant health claim to back the products. It is now generally accepted that although a food may have positive health effects and appropriate health claims, to meet consumer acceptance and demand, a product must taste good and be convenient. Therefore an interdisciplinary approach combining the food industry, science and consumer demand is vital for product innovation.



Bifidobacteria

Bifidobacterium bifidum

Reader Enquiry

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Fiber Optic Duplexer Module (FDM)

Award Winner

Mohd. Khazani Abdullah, Mohd. Hanif Yaacob, AH Hussein and AAA Bakar

Telecommunications and Internet Service Providers, the content developers, and the ICT end-customers are always looking for ways to increase the communication system bandwidth in order to satisfy the ever-increasing demand. In the big cities and metropolitan areas, fiber optics installed only several years back are used to its full capacity. Therefore, new fiber have to be constantly installed, but at a very high cost. Thus, a new but simple way of solving this problem is desirable and is introduced by UPM. Fiber Duplexer Module (FDM) is a totally passive optical device capable of doubling fiber utilization. It converts fiber optics simplex transmission mode (one fiber in each direction) into full duplex transmission (bi-directional transmission in a fiber). Thus using only a single fiber core per link instead of two cores in the existing systems. This is achieved without wavelength conversions, optical-electrical conversion and without power supplies.

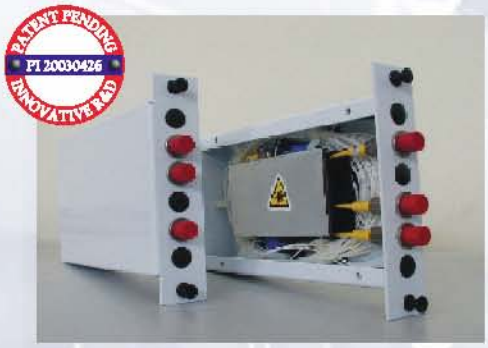

Figure 1: Fiber Duplexer Module (FDM)

This device comes with some special features. Totally passive components used to develop FDM make this device transparent of bit rate, transmission format and network architecture. It is a plug-and-play device that can be installed in less than five minutes without requiring any high skill personnel. All the features mentioned make FDM very flexible to support a single fiber bi-directional transmission with no maintenance required. FDM can support up to 70 km fiber distance. This is a fiber optics typical transmission distance without amplifier. The quality of the data is maintained at zero Bit Error Rate (BER) at up to 2.5 Gbps (STM-16) transmission rate as successfully tested at Telekom Malaysia Testbed.

The main advantage of FDM is that it could be installed in the existing networks without interfering with the communication equipment. The existing fibers that are used to support simplex transmission could now support full duplex transmission without any modification to the equipments involved. This capability gives advantage to most system users, especially lease line companies, where maximum fiber utilization has become among their main objectives.

Figure 2: FDM installed in the existing networks

By doubling the fiber utilization, more bandwidth is suddenly available, thus the service providers could offer more applications to the customers. This could benefit the telecommunication companies in the country such as Telekom Malaysia, Maxis, Time dot Com, and MIMOS. The bandwidth increment leads to the increment in the number of customers and the applications. FDM also enables the use of some of the fiber cores as the back-up or protection channels at no additional cost. FDM basically could support fiber optics LAN, SONET/SDH System and DWDM System and transparent to protocols such as ATM, FDDI and IP.

The product has won several medals and is patent-pending under Malaysian Patent registration number **PI 20030426.**

GOLD – *The British Invention Show (London) 2004.*
GOLD – *IENA (Germany) 2004.*
Award of Excellence – *Excellent Scientist Award 2004.*
GOLD – *UPM Invention & Research Exhibition 2002.*
SILVER – *International Exhibition of Inventions, New Techniques & Products, Geneva 2002*

Reader Enquiry

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Reportage

From Page Twelve

Excellent Scientist Award 2004

The Ministry of Higher Education, Malaysia organized this event on 17 September 2004 at the Grand Ballroom, KL Legend Hotel, Kuala Lumpur to honour and recognize the outstanding IPTA scientists in Science and Technology who have excelled in their fields and have succeeded in receiving international recognition by wining various International awards earlier. Each recipient has demonstrated exceptional creativity, a willingness to overcome challenges and the ability to embrace new concepts all in the pursuit of new knowledge.

Scientists and researchers from various disciplines and institutions attended the awards ceremony. Y.B. Dato' Dr. Shafie bin Hj. Mohd. Salleh officiated the ceremony and gave away awards. The 14 winners of this year's Excellent Scientist Award from Universiti Putra Malaysia are:

Turn to centre page for pictorial news.

	Recipient/ Faculty
1.	Ahmad Husni Mohd Hanif (Assoc. Prof. Dr.) — *Agriculture*
2.	Azmi Yahya (Assoc. Prof. Dr.) — *Engineering*
3.	Fakrul Razi Ahmadun (Assoc. Prof. Dr.) — *Engineering*
4.	Ishak Aris (Assoc. Prof. Dr.) — *Engineering*
5.	Mohd. Hanif Yaacob (En.) — *Engineering*
6.	Mohd. Khazani Abdullah (Assoc. Prof. Dr.) — *Engineering*
7.	Radin Umar Radin Sohadi (Prof. Dr. Ir.) — *Engineering*
8.	Ramasamy Muniandy (En.) — *Engineering*
9.	Robiah Yunus (Dr.) — *Engineering*
10.	Wong Shaw Voon (Dr.) — *Engineering*
11.	Maznah Ismail (Assoc. Prof. Dr.) — *Medicine and Health Sciences*
12.	Mohd Zobir Hussein (Prof. Dr.) — *Sciences*
13.	Mohd Azmi Mohd Lila (Prof. Dr.) — *Veterinary Medicine*
14.	Mohd Azmi Mohd Lila (Prof. Dr.) — *Veterinary Medicine*

FactFile

For the record

Mohamad Hafiz b. Mohamad Zamri, Publication & Promotion Unit, RMC

1 Mohamad Hafiz b. Mohamad Zamri has been transferred from the Research Grant Unit to the Publication and Promotion Unit of the Research Management Centre effective 1 December 2004. Hafiz who holds a Bachelors degree in Computer Science from Universiti Putra Malaysia to his creditability now works as an IT Officer with the Centre.

Check it out

UPM R&D Directory, Edition 2005, published by the Publication and Promotion Unit, Research Management Centre, UPM. Editors: Nayan Deep S. Kanwal, Mohd. Shahwahid Hj. Othman and Sidek Hj. Ab. Aziz. ISSN 1675-7823 is now in the press and will be available for distribution from February 2005.

A Glance at Research Inventions & Innovations at UPM[1]

Continued from Issue 6, 3rd Quarter (Sept.2004)...

No.	Faculty/ Institute	Researcher	Innovation	Research Cluster	Project Number	Allocation
151.	Engineering	Wong Shaw Voon	Development of dynamic simulation solver with novel object-oriented approach for nonlinear metal forming	SAE	09-02-04-0623-EA001	RM172,000
152.	Engineering	Yousif A. Khalid	Experimental and Finite Element Analysis of the Pressure Carrying Capacity for Reinforced Composite Material Tubes	SAE	09-02-04-0824-EA001	RM98,000
153.	Engineering	Zainuddin Md Yusoff	Design and Development of Device to measure weathering rate of granitic rocks	MEE	03-02-04-0174 EA001	RM181,080
154.	Engineering	Zairil Azhar Zaludin	Ariel Reconnaissance Vehicle for Military Surveillance with 24 hour Operation Cycle	SAE	09-02-04-0618-EA001	RM150,500
155.	Engineering	Zairil Azhar Zaludin	Controlling a high trust automatic Ariel vehicle for agriculture based activities-using a low cost autopilot system	SAE	09-02-04-0770-EA001	RM110,600
156.	Food Science and Biotechnology	Azizah Osman	Establishment and Improvement of Post-harvest Physiological Disorders of Local Dessert Bananas	AFF	01-02-04-0015 EA001	RM223,000
157.	Food Science and Biotechnology	Badlishah Sham Baharin	Separation of Vitamin E from Palm Fatty Acid Distillate Using Adsorption Column Chromatography	BAB	03-02-04-0141 EA001	RM298,700
158.	Food Science and Biotechnology	Clemente Michael Wong Vui Ling	Characterization of The 2u Plasmid of Saccharomyces cerevisiae and Construction of a High Copy Number Expression Plasmid	SAE	09-02-04-0271 EA001	RM84,920
159.	Food Science and Biotechnology	Clemente Michael Wong Vui Ling	Cloning and characterization of Novel Phytase Genes from Mitsuokella sp.	BAB	01-02-04-0390 EA001	RM128,000
160.	Food Science and Biotechnology	Foo Hooi Ling	Utilization of lactic acid bacteria isolated from Local Foods	BAB	01-02-04-0584-EA001	RM123,600
161.	Food Science and Biotechnology	Hasanah Mohd. Ghazali	Production of High Amylose Starch Through Modification of the Properties of Sago and Other Local Starches Using Pullulanase	BAB	09-02-04-0436 EA001	RM170,000
162.	Food Science and Biotechnology	Jamilah Bakar	The development of shelf stable frozen fish-based convenient products	AFF	03-02-04-0688-EA001	RM186,400
163.	Food Science and Biotechnology	Jennifer Ann Harikrishna/ Ho Chai Ling	Development of Expressed Sequence Tags from mangrove for future use in rice breeding	AFF	01-02-04-0042EA001	RM93,256
164.	Food Science and Biotechnology	Jennifer Ann Harikrishna/ Ho Chai Ling	Isolation of salinity tolerance genes from mangrove plants	BAB	09-02-04-0291 EA001	RM112,756
165.	Food Science and Biotechnology	Jinap Selamat	Development of Fat Bloom Resistance Chocolates Containing Processed Palm Oil	AFF	03-02-04-0410 EA001	RM170,000
166.	Food Science and Biotechnology	Kulaveerasingam Harikrishna	The transformation of oil palm with flowering genes	AFF	01-02-04-0044 EA001	RM115,256
167.	Food Science and Biotechnology	Lai Oi Ming	The Development of Filter Aids and Enzyme Immobilization Carriers from Cheap Silica Sources	SAE	09-02-04-0301 EA001	RM107,000
168.	Food Science and Biotechnology	Lai Oi Ming	Enzymatic synthesis of Feruloyl-Substituted Acylglycerols for sunscreen formulation	BAB	01-02-04-0054 EA001	RM152,000
169.	Food Science and Biotechnology	Mohd. Ali Hassan	Bioconversion of Food Wastes to Environmental Friendly Biodegradable Packaging Materials	MEE	08-02-04-0246 EA001	RM158,000
170.	Food Science and Biotechnology	Mohd. Ali Hassan	Bioremediation of selected lignocellulosic wastes with local beneficial fungi	MEE	08-02-04-0542 EA001	RM175,000
171.	Food Science and Biotechnology	Mohd. Yazid Abd. Manap	Bile Salt Hydrolase (BSH) from Bifidobacterium Pseudodatenulatum G4: Its Potential Uses as an Antihyper-Chcolesterolemia	BAB	09-02-04-0445 EA001	RM150,000
172.	Food Science and Biotechnology	Mohd. Yazid Abd. Manap	Suppressive Effect of Selected Prebiotic and Probiotic Bacteria on Generation of Volatile Methanethiol	BAB	09-02-04-0558 EA001	RM173,000
173.	Food Science and Biotechnology	Nazamid Saari	Production of Shelf-Stable Chilli Puree	AFF	01-02-04-0648-EA001	RM102,000
174.	Food Science and Biotechnology	Nazimah Sheikh Abdul Hamid	Production of Dried Tropical Fruit Powders Using Spray Drying and Agglomeration Technology	AFF	03-02-04-0156 EA001	RM241,690
175.	Food Science and Biotechnology	Nazimah Sheikh Abdul Hamid	Production of Shelf Stable Tropical Fruit Purees and Concentrates Through Physical and Enzymatic Modifications	AFF	01-02-04-0789-EA001	RM205,000
176.	Food Science and Biotechnology	Norihan Mohd. Salleh	Induction of Calli and hairy roots for selected Malaysian herbs for secondary metabolites production	AFF	09-02-04-0552 EA001	RM270,000
177.	Food Science and Biotechnology	Quek Siew Young	Development of Novel Durian-based Products and Their Flavour Characterization During Processing and Storage	AFF	03-02-04-0159 EA001	RM196,000
178.	Food Science and Biotechnology	Raha Abdul Rahim	Development of Nisin Inducible Expression Vector in Lactococcus	BAB	09-02-04-0334 EA001	RM198,000

[1] Data presented IRPA RM-8 (as at Cycle 1, 2004); Total 416 EAR Grants, sorted by PTJ & Name.

to be continued...

†The description of the some of the above Inventions and Innovative research products available for commercialisation at UPM are contained in the books—"R&D at UPM: Creating New Frontiers of Innovative Research", First Edition, and "R&D at UPM: Research Snapshots", First Edition, Editors: Nayan Deep S. Kanwal, Mohd. Shahwahid Hj. Othman and Sidek Hj. Abd. Aziz, Published by Research Management Centre (RMC), UPM, available from Publications & Promotion Unit, Administration Building, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia, Tel: +603 8946 6028 / 8946 6192, Fax: +603 8942 6539, e-mail: rschinfo@admin.upm.edu.my

Synthesis Reportage

NewsBriefs

Vice-chancellor's Fellowship Awards for Outstanding Performance

In a special ceremony held on 17 December 2004 at the Sultan Salahuddin Abdul Aziz Shah Cultural & Arts Centre, Associate Professor Dr. Sidek Hj. Abd. Aziz from the Faculty of Science, and the acting Dean and Associate Professor Dr. Arfah binti Salleh from the Graduate School of Management have been honoured with the best "teaching" award this year.

Professor Dr. Yaakob Che Man from the Faculty of Food Science & Technology, and Dean and Associate Professor Dr. Azmi Yahya from the Faculty of Engineering have both won the "research" award for their outstanding contributions in research this year.

Dr. Jalaluddin Harun from the Faculty of Forestry has received the award in professional services category.

e-SPRINT Training to Enhance ICT Skills

A hands-on training course to promote e-SPRINT was held at UPM Bintulu, Sarawak from 29-30 November 2004. The 2-day course targeted at the staff of UPM Bintulu campus attracted about 30 participants comprising mainly the teaching staff. Assoc Prof. Dr. Sidek Ab. Aziz and Assoc Prof Dr. Mohd. Kamil Yusof were the course coordinators and organised the course effectively which the participants thoroughly enjoyed.

e-SPRINT is derived from the acronym *"Sistem Pengurusan Rangkaian-Integrasi Nota kuliah dalam Talian"*. It is an online instructional delivery system comprising various modules developed to provide sustainable and scalable software for lecturers to create, manage and deploy online courses. The objective of e-SPRINT is to establish a system that acts as a one-stop teaching and learning resource centre for students and lecturers. e-SPRINT is a GUI-based software that is user-friendly and it's intuitive features make it easy to use. It is comparable to, most other commercially available online lecture systems.

Since 2001, about 750 participants mainly comprising lecturers have been trained in e-SPRINT. e-SPRINT won a silver medal in Expo S&T 2002, and has emerged as finalist for *"Anugerah Perdana Teknologi Maklumat 2004"* (MAMPU) organised by *Jabatan Perkhidmatan Awam*. **Turn to centre page for pictorial news.**

British Inventions Society (BIS) and Ideas-Inventions-New Products (IENA), Germany

The British Inventions Show (BIS) is the largest invention show in the United Kingdom, which is held annually in London. This year, the 4th International Inventions show event was held at Alexandra Palace, London from 21-24 October. This is the first time BIS allowed international participation whereby countries like Croatia, Japan, Korea, and Malaysia competed along with the British inventors under three main categories i.e. Leisure, Industrial, and Consumer.

There were 13 entries from Malaysia, headed by Universiti Putra Malaysia (UPM) of which 8 products were exhibited from UPM, and 5 from UTM. The show was attended by a large number of participants from all over Europe. Malaysia won the largest number of medals at the show with a total of 10 awards comprising 6 gold medals, 2 silver medals, 1 special award, and 1 special silver award. Of these, UPM seized 8 awards.

In yet another international exhibition, Ideas-Inventions-New Products (IENA) held from 28-31 October at the Nuremberg Fairgrounds (Messezentrum), Germany, out of a total of 19 exhibits from Malaysia, it got 17 awards. Of which, UPM bagged 8 prestigious medals. Universiti Teknologi Malaysia (UTM) won 3 awards while 6 went to Universiti Sains Malaysia (USM).

IENA is considered as one of the largest invention shows in Europe, which is held annually in Nuremberg, Germany. More than 25 countries including United Kingdom, Russia, China, Korea and Malaysia in various categories took part in this international exhibition this year. The Malaysian exhibits at both these international exhibitions received high commendations from the juries for displaying technologically advanced products. As usual, UPM made history by winning the largest number of awards at these shows. **Turn to centre page for pictorial news.**

No	Recipients/ Exhibits	Exhibition / Award	
		BIS	IENA
1	Fakhru'l-Razi Ahmadun (Assoc. Prof. Dr.)		
	a) Sludge Bioconversion	• 1 Gold (industrial) • 1 Special Silver (industrial)	• 1 Silver
	b) CNT and CNF Synthesis		• 1 Silver • 1 Special Switzerland Award
2	Rohiah Yunus (Dr.) Rysol-High Performance Synthetic Lubricants from Palm Oil	• 1 Gold (industrial) • 1 Silver (consumer)	• 1 Gold
3	Mohd. Hanif Yaacob (Mr.) Optical Fiber Duplex Module (FDM) / Double Carrier Modulation	• 1 Gold (industrial)	• 1 Gold
4	Ratnasamy Muniandy (Mr.) Tyre Roller Compactor (TRC) for Asphalt Mixtures	• 1 Gold (industrial)	• 1 Gold
5	Wong Shaw Voon (Assoc. Prof. Dr.) Mech T™ Impactor	• 1 Gold (industrial)	• 1 Bronze
6	Mohamad Razali Abd Kadir (Assoc. Prof. Dr.) Interlocking Load-bearing Hollow Block	• 1 Silver (industrial)	• 1 Silver

Note: All recipients from the Faculty of Engineering, UPM.

R&D Commercialization Luncheon

The fourth R&D Commercialization Luncheon organized by Research Management Centre was held at Dewan Tekimas, UPM on 11th October 2004. The event was officiated by Professor Dr. Mohd Shahwahid Hj. Othman, Director of Research Management Centre, UPM. Mrs. Hajjah Faiza Bawumi Sayed Ahmad, Mr. Fikri Abu Bakar, Mr. Yusof Sewin Mr. Fazaruddin Ibrahim from FAIZA Sdn. Bhd. and Dr. Abu Bakar Hamidon from Wonder Bran Sdn. Bhd. were the guests from the industry sector.

Assoc. Prof. Dr. Marzuki Ismail from the Faculty of Medicine and Health Science presented her research findings on *"Commercializing Specialty Oil & Antioxidant Formulation from Rice Bran"*. The objectives of her presentation are to collaborate with the industry in commercialising her two research products from the rice bran, and to further explore possibilities of joint effort in nutraceutical product development from rice and bran resources.

The function was also attended by Prof. Dato' Dr. Abdul Salam Abdullah (co-researcher), Assoc. Prof. Dr. Rozita Rosli (Deputy Dean of Research and Graduate Studies), Faculty of Medicine and Health Science), and Prof. Dr. Zulkifli Idrus, Deputy Director of Policy, Planning and Finance Unit, RMC). **Turn to centre page for pictorial news.**

Turn to Page Ten

Letters to the Editor

If you have any comments about the content of the publication or any contributions that you may wish to make for the forthcoming issues, please send them to: The Managing Editor, *Synthesis*, Publication and Promotion Unit, Research Management Centre, 3rd Floor, Administration Building, 43400 UPM, Serdang, Selangor, Malaysia or via the Internet to editor@rmc.upm.edu.my. The editor reserves the right to edit articles for clarity and space before publication.

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Are you reading your own copy of the UPM R&D Digest?

Synthesis is the first and only quarterly R&D digest at Universiti Putra Malaysia published in March, June, September and December with the focus on award-wining innovations. It covers research happenings emerging from the various faculties and institutes across the university and provides a brief summary of some of the important research findings of the study conducted at UPM. It brilliantly features special topics that are of national interest in various fields and disciplines.

Scientists must be made aware of how important the impact of their work is and its possible applications on society and public opinion. It is hoped that this digest will provide the opportunity to interact particularly through feedback or direct mail to the scientist from either the private sector or by scientists from other government research institutions.

Synthesis is the official research bulletin of the University and is published by Research Management Centre. It is available free of charge to the academic community.

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